IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of:

James W. Hendry

Group Art Unit: 1732

Examiner: Suzanne E. McDowell

Serial No.: 10/770,932

Filed: February 3, 2004

For: METHOD FOR INJECTION MOLDING OF PLASTICS MATERIALS USING GAS HOLDING PRESSURE IN MOLD

Attorney Docket No.: LC 0148 PUS

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Karen A. Hopf
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Karen A. Hopf

REVISED

BRIEF ON APPEAL

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following Appeal Brief is submitted pursuant to the Notice of Non-Compliant Appeal Brief dated April 27, 2007. Please charge any fee to Deposit Account No. 50-0476.

I. Real Party in Interest

The real party in interest in this matter is Lear Corporation, 21557 Telegraph Road, Southfield, Michigan (hereinafter "Lear").

II. Related Appeals and Interferences

There are no other known appeals or interferences which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of the Claims

Claims 12-14 and 16-18 stand rejected in the final Office Action dated October 12, 2006. Claims 1-11 and 15 have been cancelled.

IV. Status of Amendments

No Amendments were filed following the June 17, 2005, Office Action.

V. Summary of Claimed Subject Matter

A. In General

The present invention provides an improved gas-assisted plastic injection molding system for making parts and components in which a spill-over cavity is not utilized or required. As explained in Paragraphs 23-28 of the Applicant's specification, the part mold. 12 is sealed and initially pressurized to a pre-specified pressure P1. An electronically controlled gas pressure valve 40 is utilized to control the pressure of the gas in the mold. The gas pressure valve is infinitely pressure controlled and a pressure switch is utilized to control its operation.

As the plastic material is injected into the mold, the initial pressurized gas increases in value until it reaches a pre-specified or predetermined pressure P2. As further explained in Paragraphs 30-32, when the injected pressure has compressed the pre-charged gas pressure to the maximum pre-selected pressure P2 as set in the gas

pressure valve, any excess pressure will be vented (through valve 40). The pressure is then held constant in the mold cavity. Pressurized gas at pressure P3 is then injected into the plastic material in the mold cavity 18. The gas forces the plastic material into all of the portions of the mold cavity and forms a hollow cavity 62 in the material. The remaining plastic material 60 is injected into the mold cavity sufficient to make the completed molded part.

Then, as disclosed in Paragraphs 34-35 of the specification, when substantially all of the plastic material is injected into the mold cavity, the pressure valve allows venting of the pre-pressurized gas P2 at a controlled rate of pressure. Once the plastic material is solidified and cooled sufficiently to make the part self-supporting, the pressurized gas inside the hollow cavity in the molded part is vented, the mold is open, and the part is ejected from the mold cavity. A pressure switch is utilized to control the operation of the gas pressure valve.

B. **Independent Claim 12**

Claim 12, which is independent, claims a system 10 which includes a mold 12 having a cavity 18 therein. Sealing members 36, 38 are used to seal the mold 12 to prevent gas leakage. A first gas source 33 is used to supply gas into the mold cavity 18 to pre-pressure it to a first valve P1. An electrically infinitely controlled pressure valve 40 is provided to remove the pre-pressurized gas as desired. A gas control mechanism 40 is utilized to maintain the gas pressure in the mold cavity 18 at a second valve P2. The system also includes a source 20, 22 for injecting molten plastic material into the mold cavity 18, a gas pin assembly 30 for supplying gas into the plastic material in the mold cavity 18, and a second gas source 32 for supplying gas to the gas pin assembly 30.

The system 10 is explained in Paragraphs 20-32 of the Specification and shown schematically in Figures 1-5.

C. **Dependent Claims 13-14 and 16-17**

Claims 13-14 and 16-17 are all dependent from independent claim 12. Claim 13 adds to the subject matter of claim 12, an ejector pin assembly 34 which is used to eject

completed parts from the mold cavity 18. The ejector pin 34 is shown in Figures 1-5 and described in Paragraph 35.

Claim 14 requires that the first gas source 33 and the second gas source 32 to be the same source. This is described in Paragraph 25, but not shown in the drawings.

Claim 16 adds the feature of a pressure switch 41 to the system 10 for controlling the operation of the valve 40. This is shown in Figures 1-5 and discussed in Paragraph 28.

Claim 17 adds the feature to claim 12 that the gas pin assembly and ejector pin assembly are combined in one assembly 70. This is shown in Figure 6 and discussed in Paragraph 46 of the specification.

D. Independent Claim 18

Claim 18 is an independent claim and covers a system 10 for forming an injection molded plastic part in a mold cavity 18. The system 10 includes a mold 12 having the cavity 18, sealing members 36, 38, a first gas source 33 for pressurizing the mold cavity 18 to a first valve P1, an electrical infinitely controlled pressure valve 40 having a gas control mechanism for maintaining the pressure in the mold cavity 18 at a second valve P2, a source 20, 22 for injecting plastic into the mold cavity 18 and a second gas source 32. The system 10 also includes a combination gas pin assembly and ejector pin mechanism 70.

The basic system 10 is explained in Paragraphs 20-32 and shown schematically in Figures 1-5. The mechanism 70 which combines the gas pin assembly and ejector pin mechanism is shown in Figure 6 and discussed in Paragraph 46 of the specification.

VI. Grounds of Rejection to be Reviewed on Appeal

1. Are claims 12, 14 and 16 properly rejected under 35 U.S.C. §102(b) as being anticipated by the Shah et al. patent (No. 5,558,824)?

2. Are claims 12, 14 and 16 properly rejected under 35 U.S.C. §103(a) as being unpatentable over the Shah et al. patent (No. 5,558,874)?

3. Are claims 13, 17 and 18 properly rejected under 35 U.S.C. §103(a) as being unpatentable under the Shah et al. '824 patent when taken further in view of the Guergov patent (U.S. No. 6,019,918).

VII. Argument

A. The Rejection of Claims 12, 14 and 16 as being anticipated under 35 U.S.C. §102(b) by Shah et al. is not sustainable.

Claim 12 is an independent claim and distinguishes the Applicant's invention from the prior art. It is submitted that the Shah et al. patent does not disclose the inventive combination of features forming the Applicant's invention as set forth in the claim 12.

The Shah et al. reference does not disclose or suggest the use of a gas pressure valve for removing the gas from the mold cavity as the plastic material is injected into it and later when it is necessary to allow the plastic material to completely fill the mold cavity. Also, Shah et al. does not disclose or suggest the use of an infinitely adjustable pressure control valve for removing the gas from the mold cavity as the plastic material is injected into it and later when it is necessary to allow the plastic material to completely fill the mold cavity.

Dependent claim 16 in particular requires the use of a pressure switch to control the operation of the infinitely adjustable pressure control valve. The Shah et al. reference does not disclose or teach the use of such a pressure switch to perform such a function.

These structural and operation differences of the present invention over the Shah et al. reference shows that the anticipation rejection under §102(b) should be reversed.

B. The Rejection of Claims 12, 14 and 16 as being unpatentable under 35 USC §103(a) over Shah et al. is not sustainable.

The Applicant's invention provides an improved gas-assisted injection molding system for making parts and components in which a spill-over cavity is not needed or utilized. The mold is a sealed mold which is sealed by appropriate sealing members. The mold cavity is initially pressurized to a first pre-specified pressure by a first gas source. The system includes an electrically controlled valve which is infinitely pressure controlled and which is used to control and remove the gas from the mold cavity as desired. The valve is described in Paragraphs [0009] and [0011] in the specification and can be a Tescom servovalve as indicated in Paragraph [0024].

A gas control mechanism is also included and used to maintain the gas pressure in the mold cavity at a second pre-determined value. A plastic injection source is utilized to inject plastic into the mold cavity. This will increase the first pressure value until it reaches the second pressure value triggering the gas control mechanism. Any excess gas pressure will be vented by the electrically controlled infinitely pressure control valve.

The system also includes a gas pin assembly and a second gas source. The gas pin assembly supplies gas into the plastic material in the mold cavity from the second gas source. As specified in dependent claim 14, the first and second gas sources could be the same gas source. In addition, as specified in dependent claim 16, a pressure switch can be utilized to control the operation of the infinitely pressure control valve.

The gas injected into the plastic material in the system forces the plastic material into all portions of the mold cavity forming a completed part with a hollow interior. Additional plastic could be injected as needed. As the plastic material is forced into all portions of the mold cavity, the pressure control valve allows controlled venting of the pre-pressurized gas from the mold cavity.

Once the plastic material has solidified in the mold cavity, the pressurized gas inside the part is vented. Then the mold is opened and the part is ejected.

The Shah et al. patent does not disclose or suggest the Applicant's system as set forth in any of claims 12, 14 and 16. Shah et al. does not teach the use of a gas pressure valve for removing the gas from the mold cavity as the plastic material is injected into it and later when it is necessary to allow the plastic material to completely fill the mold cavity. This is a significant difference.

In addition, Shah et al. does not teach the use of an infinitely adjustable pressure control valve at all, let alone one which is used for removing the gas from the mold cavity in the manner stated. The infinitely adjustable pressure control valve first removes the gas from the mold cavity as the plastic material is being injected into it, and then secondly removes the remaining gas in the mold when it is necessary to allow the plastic material to completely fill the mold cavity.

It is submitted that persons of ordinary skill in the art with the Shah et al. patent in front of them, would not come up with the system as set forth in independent claim 12, or

independent claims 14 and 16. There simply is no motivation, suggestion or teaching to do so.

C. The rejection of claims 13, 17, and 18 as being obvious and thus unpatentable under 35 U.S.C. §103(a) over a combination of Shah et al. and Guergov is clearly erroneous and not sustainable

Claims 13 and 17 are both dependent from independent claim 12 and add further features to it. Claim 13 adds the feature of at least one ejector pin for ejecting the plastic part from the mold cavity, while claim 17 adds the feature of combining the gas pin and ejector pin in the same assembly. Although either of these features by themselves may not be allowable, they render the subject matter of claim 12 unobvious and patentable.

Claim 18 is independent and similar to claim 12, but essentially has the subject matters of claims 13 and 17 added to it. Claim 18 thus is obvious and patentable for the same reasons as claim 12 in combination with the features of both claims 13 and 17.

It is submitted that the combination of Shah et al. and Guergov does not disclose or suggest the entire combination of features set forth in claim 18. There simply is no teaching, motivation or suggestion to combine Shah et al. and Guergov in a manner which includes all of the features and limitations of claim 18.

Neither the Guergov or Shah et al. references disclose or suggest the use of a gas pressure valve for removing gas from the mold cavity as the plastic material is injected into it, and then later using that same valve to also remove gas from the mold cavity as the plastic material is forced into every part, surface and corner of the mold cavity.

Similarly, neither of the references disclose or suggest the use of an infinitely adjustable pressure control valve to perform these functions.

VIII. Claims Appendix

Copies of each of the claims involved in this case are attached as a Claims Appendix. Claims 12-14 and 16-18 are at issue.

IX. Evidence Appendix

None.

X. Related Proceedings

None.

XI. Conclusion

For the foregoing reasons, the Appellant respectfully requests that the Board direct the Examiner in charge of this case to withdraw all of the rejections of claims 12-14 and 16-18.

Please charge any fees required in the filing of this appeal to deposit account 50-0476.

Respectfully submitted,

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Date: May 29, 2007

CLAIMS APPENDIX

1. Cancelled.
2. Cancelled.
3. Cancelled.
4. Cancelled.
5. Cancelled.
6. Cancelled.
7. Cancelled.
8. Cancelled.
9. Cancelled.
10. Cancelled.
11. Cancelled.
12. (Previously Presented) A system for forming an injection molded plastic part in a mold comprising:

a mold, said mold having a part-forming mold cavity therein;

sealing members for sealing said mold cavity and preventing gas leakage therefrom;

a first gas source for supplying a gas into the mold cavity to pre-pressurize the mold cavity to a first pre-determined value;

an electrical infinitely pressure controlled valve for removing said pre-pressured gas from the mold cavity as desired;

a gas control mechanism for maintaining the gas pressure in the mold cavity at a second pre-determined value;

a source for injecting molten plastic material into the mold cavity;

a gas pin assembly for supplying gas into the plastic material in the mold cavity; and

a second gas source for supplying gas to said gas pin assembly.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS

None.

13. (Original) The system as recited in claim 12 further comprising:

at least one ejector pin assembly for ejecting the completed plastic part from the mold cavity.

14. (Original) The system as recited in claim 12 wherein said first and second gas source are the same source.

15. Cancelled.

16. (Previously Presented) The system as recited in claim 12 further comprising a pressure switch for controlling the operation of said valve.

17. (Previously Presented) The system as recited in claim 13 wherein said gas pin assembly and ejector pin assembly are combined in one assembly.

18. (Previously Presented) A system for forming an injection molded plastic part in a mold comprising:

a mold, said mold having a part-forming mold cavity therein;

sealing members for sealing said mold cavity and preventing gas leakage therefrom;

a first gas source for supplying a gas into the mold cavity to pre-pressurize the mold cavity to a first pre-determined value;

an electrical infinitely pressure controlled valve for removing said pre-pressured gas from the mold cavity as desired;

a gas control mechanism for maintaining the gas pressure in the mold cavity at a second pre-determined value;

a source for injecting molten plastic material into the mold cavity;

a gas pin assembly for supplying gas into the plastic material in the mold cavity;

a second gas source for supplying gas to said gas pin assembly; and

at least one ejector pin assembly for ejecting the completed plastic part from the mold cavity;

said gas pin assembly and at least one of said ejector pin assemblies being combined in one assembly.